

VTO 232 M1 REFERENCE MANUAL



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INTRODUCTION

The VT0232 Video Text Overlay super-imposes text onto a video camera signal and if fitted with the measurement option, allows the user to measure areas, angles or distances using a double crosshair.

Functions are selected from the on-screen icons using a computer style 'point and click' mouse making the unit simple to operate and easy to learn.

A real time clock shows date and time with a 1/10 th of a second resolution. The clock continues to run when power is removed and only requires periodic adjustment of minutes when necessary. The time and date display can be switched off if necessary by one of the screen icons.

All the screen icons can be switched off so that the full camera picture can be seen.

Text and lines can be displayed in black or white, with the white level being adjustable using the mouse. When text only is displayed it can be shown against a reverse colour box for greater contrast e.g. white characters against a black background or vice versa.

When typing in text from the keyboard, the starting position can be set using the mouse, allowing an area, angle measurement or other point of interest to be marked on screen.

The graphics area of the screen has a resolution of 304 by 180 pixels and allows distance or area measurements to be calibrated in microns using the built in calibration procedure. Five different calibration values can be selected and each one can be assigned a lens magnification. This allows the user to simply identify and change the calibration values for the lens in use. When a particular lens has been selected, a scale bar is displayed, allowing video prints or recordings of the sample to be scaled later. Calibration values are stored in non_volatile memory and are not lost when power is removed.

Text can be displayed on 18 lines with up to 38 characters on each line. Two lines are reserved at the bottom of the screen for displaying information from the Linkam temperature programmer and are also used for calibration and brightness setting.

The VTO232 can be used with 625 line or 525 line cameras using either composite video or the newer Y/C system. The Y/C system has a much higher resolution when recorded on a S-VHS video recorder and gives a better display of colour and intensity when displayed on a Y/C monitor avoiding many of the colour 'rainbow' effects seen with composite video.

CONNECTING THE VIDEO SYSTEM

The drawing shows the typical connections required for both composite video and a Y/C video system. For composite video the camera's output signal must be 1 volt p-p composite video with 75 ohm output impedance and should be connected to the VTO232 COMPOSITE VIDEO IN socket. When used with a Y/C camera the output should be 1 volt p-p, 75 ohms for Y and 0.3 volts p-p, 75 ohms for C. The overlayed video signal is output from the socket marked COMPOSITE VIDEO OUT or Y/C VIDEO OUT and should be connected to a monitor, video recorder or video printer with an input impedance of 75 ohms. Failure to do this will result in a picture which has poor definition and loss of colour. Sometimes it may be necessary to swap over the position of the monitor and recorder, as some do not buffer their video in and out signals as well as others resulting in a loss of picture quality.

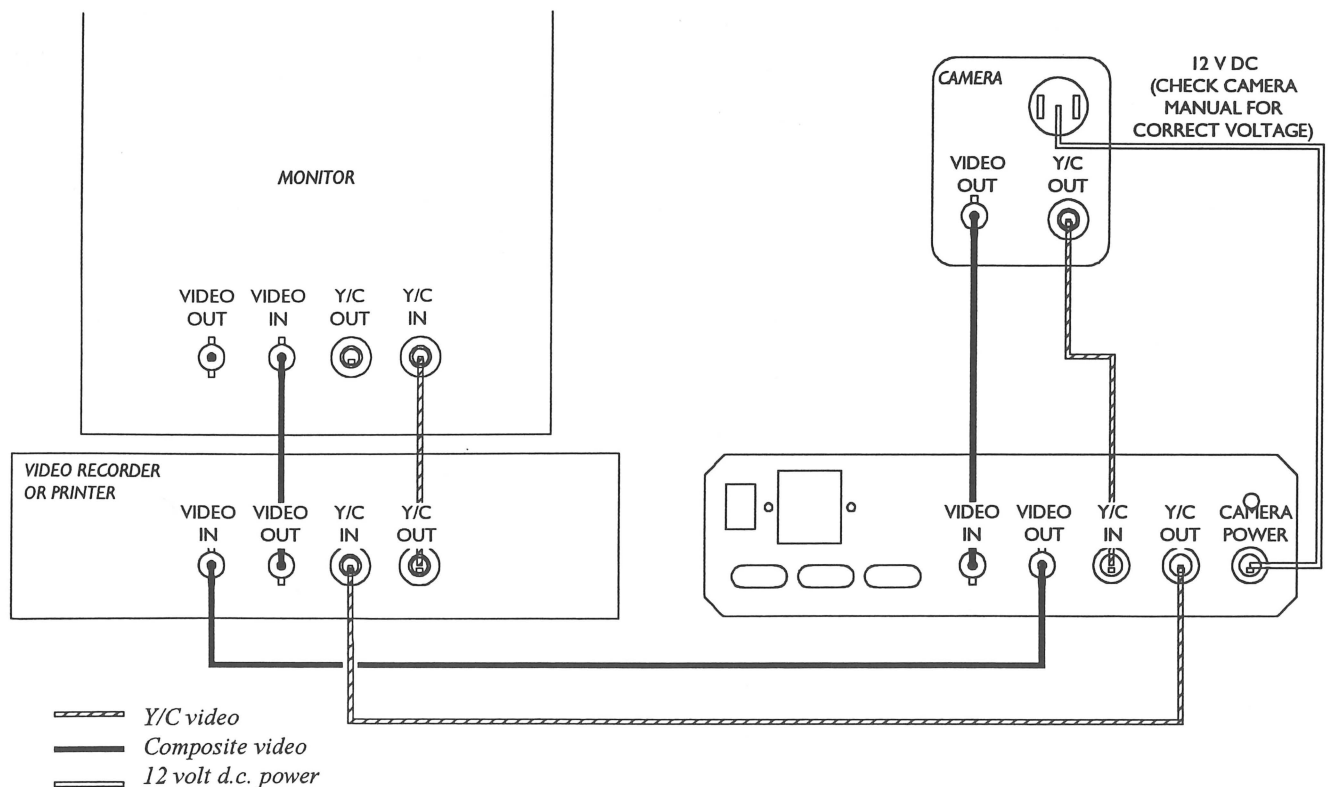
NOTE: THE RF CONNECTOR OF A VIDEO CASSETTE RECORDER CANNOT BE USED. IF THE VCR DOES NOT HAVE A COMPOSITE VIDEO B.N.C. CONNECTOR THEN USE THE SCART CONNECTOR.

Scart connector

If possible always use B.N.C leads for composite video. However if the VCR has only a scart connector then connect as follows:

- pin 17 video ground
- pin 19 Composite video out
- pin 20 Composite video input

	20	18	16	14	12	10	8	6	4	2	
\	21	19	17	15	13	11	9	7	5	3	1



CAMERA POWER SUPPLY

A power supply of 12 V d.c. at 600 mA is provided by the VTO232 for use with most cameras. Before connecting the camera to the VTO232 check that camera's d.c. voltage and current requirements.

A 3 pin miniature din connector and lead is supplied with the VTO for use with a camera. The other end of the cable has no connector as there are no standard power connectors used by the camera manufacturers.

The connections are as follows:

RED----- wire is +12V d.c.

BLUE----- is 0V d.c. or ground.

CONNECTING THE TMS91, TP91 OR TC91 PROGRAMMER

The TMS91, TP91 and TC91 are connected to the VTO232 via a 9 way 'D' type connector which is supplied with a screwlock fitting to prevent the connector from coming loose. This cable should only be fitted when the power is off on both units. If the VTO232 is supplied for a TMS91 or TP91 which have a remote control, the 9 way 'D' type connector and lead will already be fitted to the programmer. If the programmer does not have a remote control then a separate lead will be supplied. This connects from the TMS91/TP91/TC91 connector marked VIDEO/REMOTE to the VTO232 connector marked PROGRAMMER INPUT. If the VTO232 has been ordered separately make sure that the correct switch has been set inside (see Programmer type selection below).

Programmer type selection

When the VTO232 is supplied with a Linkam Hot Stage and programmer it will have been factory set for the programmer type. To use it with a different programmer one of the internal switches must be changed. Turn the power off and remove the lid as shown, locate the switch marked TMS. This should be in the UP position for the TMS91 and down for the TC/TP91. Make sure that the switch marked TS1 is in the up position.

VIDEO SET UP

625/525 Line selection

When the VTO is supplied it will have been factory set for 625 or 525 line video operation as this requires two different crystals. If a crystal for a different video line operation is fitted then this programming switch will need to be changed. Turn the power off and remove the lid as shown, locate the dip switch marked 5/6. This should be in the UP position for 625 line and in the down position for 525 line. A 12 MHz crystal is fitted for 625 line and a 12.0839 or 12.096 MHz for 525 line operation.

Setting up the picture

It is advisable to switch on the VTO232 before the programmer. On switch on, time and date will always be displayed even if the programmer is not connected. The first time the VTO232 is used, it is possible for the character display to roll across the screen from side to side, in which case a slight adjustment may be necessary. Turn the power off and remove the lid as shown, slowly turn the capacitor trimmer marked TRIM as shown in the diagram. Once set it will require no further adjustment.

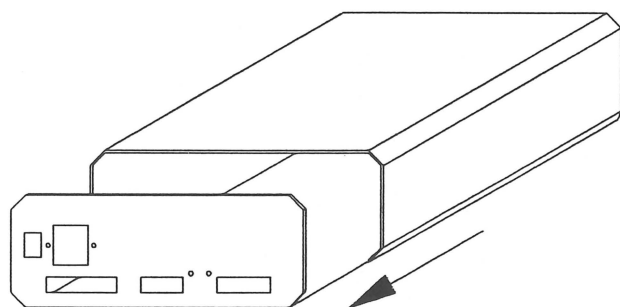
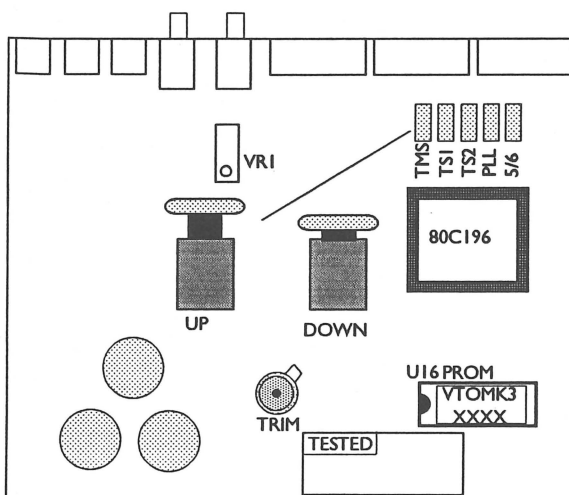
If the extra phase locked loop board is fitted then refer to page 8.

Black level setting

The black level should not require adjustment as it is factory set using a standard video test source or camera. However, some cameras due to their output impedance cause the black and white voltage levels to be incorrect. This can be adjusted by displaying a fairly light picture and with the VTO232 set to display black characters over the background (default setting at power on) look at the intensity of the black on the screen. If it looks grey then turn the power off and remove the lid as shown and adjust VR1 until the black level is restored.

CONNECTING THE MOUSE AND KEYBOARD

The mouse should be connected to the VTO232 using the 9 way 'D' connector marked mouse. The keyboard plugs into the connector marked SERIAL PORT.

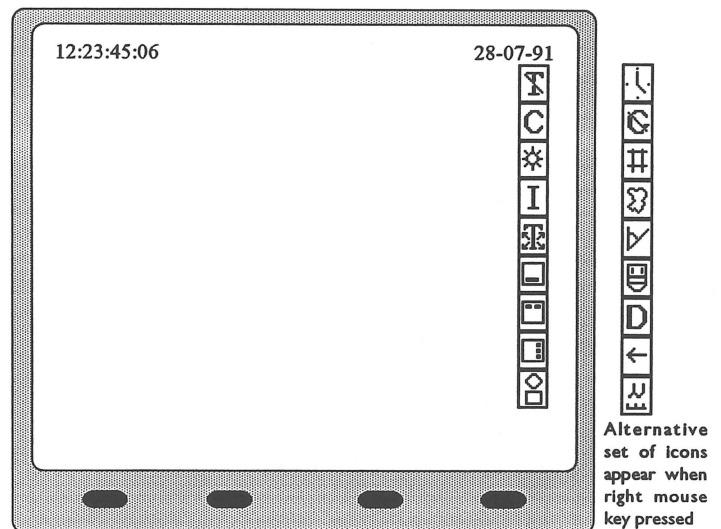


USING THE VTO232

When the VTO232 is switched on, the screen should look like this. The time and date is shown at the top of the screen with the selection icons down the side.

The top icon should be displayed in white and the rest in black. As the mouse is moved in an up and down movement the selected icon will change from white to black.

Click the right mouse button to change the display to the alternative set of icons. If the measurement option is purchased the full set of icons shown will appear otherwise only the clock face will appear. Click again to see the first set of icons.



Selecting a function

To select a function, move the mouse until the required icon is displayed in white and then click the left mouse button.

To complete the function some require a right button click (see Icon functions below) .

Icon functions



Delete text only

Click the left button to delete all the text typed onto the screen from the keyboard.



Changing the colour

Click the left button to change the display colour from white to black and vice-versa.



Brightness

This allows the white level to be adjusted in intensity. Click the left button and a message will be displayed together with a set of numbers from 0 to 9, 9 sets the maximum intensity with 0 as the minimum. Move the mouse until the required number is highlighted. Click the left button and the number will appear in the right hand corner. If the number is incorrect move the mouse again until the new number is highlighted and click the left button. When the correct number has been selected, click the right button.



Inlay text in a box

Click the left button to display text in a reverse colour box. e.g. White characters in a black box or black characters in a white box. If there are any graphics on the screen this function will not work.



Text position

Click the left button and a white block (or black if in reverse colour) will appear in the centre of the screen. Move the mouse until the block is in the correct position for the text and then click the right button. Any text typed in at the keyboard will now appear on the screen starting from this position.



Programmer display on / off

Click the left button to turn the programmer display off. Click again to turn the programmer display on.



Time and date display on / off

Click the left button to turn the time and date display off. Click again to display time and date information.



Icons display on / off

Click the left button to turn the icons display off. Click again to display the icons.



Video recorder start / stop

Click the left button to change the logic level output used to drive the video cassette recorder. The last logic level used is saved in non-volatile ram, so that the correct start or stop level for the VCR can be re-used.



Time and date setting

Click the left button. The minutes unit value will be highlighted. As the mouse is moved from left to right the numbers in the time and date field will be highlighted. Highlight the number to be changed and click the left button. For each click the number will increment by one. If a number reaches its maximum value, whether it is the units or tens digit it will change to its minimum value. e.g. 58-click 59-click-00. Click the right button to finish.



Delete graphics only

Click the left button to delete all the lines drawn by the area, angle or crosshair function.



Crosshairs

Click the left button and two sets of crosshairs will appear on the screen. Moving the mouse will now re-position one pair of crosshairs on the screen. Click the left button to move the other set of crosshairs. This process can be repeated as often as required. The distance between the two X and Y crosshairs will be displayed in the bottom right hand corner of the screen. The distance will be shown in the units set by the lens number selected. Click the right button to finish.



Area measurement

Click the left button. A small cross will appear in the middle of the screen. Move the cross to the starting point of the area to be traced and click the left button. A small dot will appear which marks the start point. Move the cross to the next point on the object and click the left button. A line will be drawn from the previous point to this new point. Continue this process until the object outline has been traced. Clicking on the right button will draw a line to the start point to complete the area. The cross will now re-appear and should be moved inside the closed area. Click the left button and the area value will be displayed in the units set by the lens number selected.



Angle measurement

Click the left button and a small cross will appear in the middle of the screen. Move the mouse until the centre of the cross is positioned at the starting point of the first line. Press the left button and drag the mouse to the starting position of the second line. Click the left button. As the mouse is dragged the obtuse and acute angles between the two lines will be displayed. To finish click the right button.



Selecting a lens or calibration factor

Click the left button and the current calibration values and lens magnification will be displayed. Click the left button to select the next calibration factor and lens magnification. When all five have been displayed the first value will be repeated. Click the right button when the correct calibration factor and lens magnification is displayed. A scale bar showing a set distance and value will be displayed.



Double height, double width characters

Click the left mouse button and the icons, time and date will disappear. When a key is pressed on the keyboard an underline cursor or solid block will appear. When finished, press the left mouse button and the icons and the time and date will re-appear. The colour or inlay mode can be changed, and if D is selected again, the existing text can be added to or changed. The cursor can be switched off by pressing the ESC key.

Do not use the text position icon as this only works for standard text.

After using this double height mode do not use the measurement functions until the delete text and delete graphics have been used as the results can be unpredictable.



Pointer Function

Click the left mouse button and a pointer will appear. Move the mouse until the pointer is in the required position. Click the left button to place the pointer. Up to fifty or more pointers can be drawn, enabling the user to 'track' sample movements or to highlight areas of interest.



Length Calibration

Click the left mouse button. Confirmation of this calibration mode will be asked, just in case you entered it by mistake. To continue with calibration click the left mouse button.

The VTO232 is supplied with five calibration values which have been set using 10, 20, 40, 50 and 80X lenses from an Olympus BH2 microscope. The microscope was fitted with a 3.3 times camera relay lens and a JVC TK1085E CCD camera. The graticule used (Linkam part number MD.300) is marked with 0.1 and 0.01mm diamond ruled lines. The following procedure will calibrate the on screen movement in microns.

- 1) Place the graticule on the microscope with its lines in a horizontal direction.
- 2) Click the left button and move a crosshair pair until its horizontal line is over one of the graticule lines. Click the right button.
- 3) Click the left button and move the other crosshair pair until its horizontal line is over a different graticule line. Click the right button.
- 4) The distance between the two lines of the graticule can now be entered. In case the crosshairs did not line up with the graticule exactly, the distance can be entered with a decimal point approximation. The value entered must be in microns. A set of numbers will appear on the left hand side of the screen. Move the mouse over the number to be entered and click the left button. This number will appear at the right hand side of the screen. Carry on pointing and clicking using the decimal point if necessary until the graticule distance is displayed at the right of the screen. Click the right button.
- 5) Repeat the process but turn the graticule through 90° so that the vertical lines can be calibrated.

- 6) Use the mouse to enter the lens magnification used for the calibration.
- 7) Use the mouse to set the lens number from 1 to 5.

NOTE: DURING THE ANGLE, AREA AND CROSSHAIR FUNCTIONS ANY KEYBOARD INPUT WILL NOT BE RECOGNISED. USE THE TEXT POSITION FUNCTION AFTERWARDS TO LOCATE THE TEXT.
IF AREA OR ANGLE ARE SELECTED BY MISTAKE, PRESS THE RIGHT MOUSE BUTTON BEFORE ENTERING ANY DATA POINTS

KEYBOARD TEXT ENTRY

Using the keyboard and the text position function, text can be placed anywhere on the 18 line by 38 character area. Keyboard functions include backspace, delete and cursor movements using the up, down, left and right arrow keys. When in box mode, delete is used to move the cursor outside of the existing box and into an unused portion of the screen it will cause a new blank box to appear. To move to another screen box area for delete, use the arrow keys or the text position function. The cursor can be switched off by pressing the ESC key. The keyboard HOME key can be used to send the cursor to the top left of the screen.

RS232 COMPUTER INTERFACE

To use the computer interface the keyboard must be removed as the connector marked SERIAL PORT is used for both. The baud rate is set to 2400 baud with 7 data bits, 1 stop bit and even parity.

Pin connections for Personal Computer

VTO232 to 9 way 'D' type

VTO232		PC	
TX	pin 3	RX	pin 2
RX	pin 2	TX	pin 3
RTS	pin 7	CTS	pin 8
CTS	pin 8	RTS	pin 7
GND	pin 5	GND	pin 5
		DSR	pin 6
		DTR	pin 4

VTO232 to 25 way 'D' type

VTO232		PC	
TX	pin 3	RX	pin 3
RX	pin 2	TX	pin 2
RTS	pin 7	CTS	pin 5
CTS	pin 8	RTS	pin 4
GND	pin 5	GND	pin 7
		DSR	pin 6
		DTR	pin 20

The VTO232's serial computer port follows a DTE pinout and uses an RTS/CTS handshake. The signal levels for TX and RTS are standard RS232, but for RX and CTS both RS232 levels or logic levels will be accepted.

If your computer does not drive CTS then connect pin 5 to the computers DTR line and DSR line.

NOTE: DO NOT USE PIN 9 OF THE RS232 CONNECTOR AS THIS IS INTERNALLY CONNECTED TO 5 VOLTS IN ORDER TO POWER THE OPTIONAL KEYBOARD

RS232 commands

Any text sent by the computer, including arrow key movements, will be handled in the same way as the keyboard. This allows text to be positioned anywhere on the 18 lines by 38 character screen area.

SERIAL COMMAND	HEXADECIMAL CODE
CURSOR UP	0Bh
CURSOR DOWN	0Ah
CURSOR RIGHT	09h
CURSOR LEFT	08h
CURSOR HOME	0Fh
DELETE CHARACTER	7Fh
CARRIAGE RETURN	0Dh
CURSOR OFF	1Bh

SOFTWARE UPGRADE FOR MEASUREMENT

Carefully remove the integrated circuit marked with a label VTOMK3 XXXX - see diagram on page 4. This should be done by gently lifting each end of the chip by a small amount at a time.

Insert the new chip making sure that the end with the piece removed is lined up with the white marking on the board (see diagram on page 4). Be careful not to bend any of the pins as you push the chip into the socket.

Check to make sure that all the pins are in the socket.

MOUSE CLEANING

After a period of time, the mouse movement on the screen may appear to be intermittent. This is usually caused by a build up of dust or dirt on the rollerball used in the mouse. Remove the ball by turning the ring marked with an arrow in the direction shown. Clean the ball until it looks and feels smooth. If it has become very dirty, it may have affected the white nylon rollers inside the mouse. These should be cleaned very carefully as strong solvents may affect the lubrication of the rollers. Insert the ball and screw the cover on, in the opposite direction to the arrow.

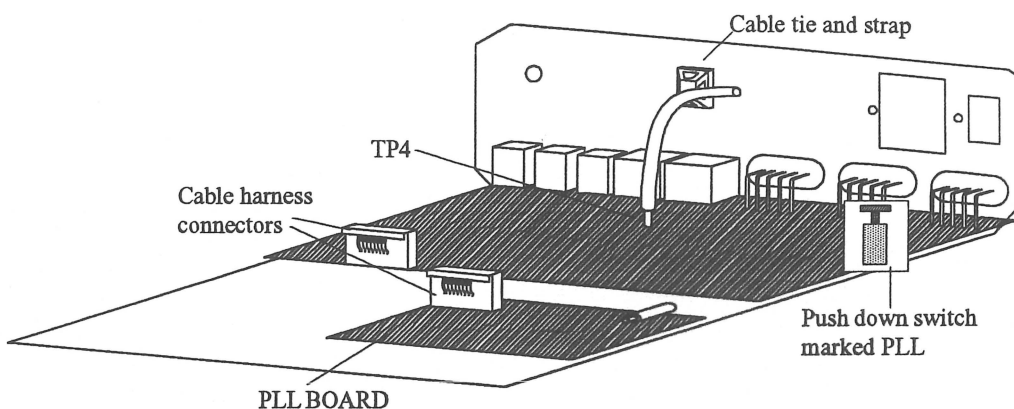
PHASE LOCKED LOOP BOARD

Fitting into chassis

Switch the VTO232 off. Remove the board from the packing and screw it into place on the two supporting pillars in the chassis as shown below. Carefully, solder the end of the thick black wire onto a pin marked TP4 which is located near the back of the VTO232 in between the two connectors marked VIDOUT and VIDIN. The wire should be held in place on the back panel using the plastic strap provided. The strap should go through the clip and then around the cable before it is joined together.

Push the connector on the end of the multi wire cable harness onto the pins marked EXTPLL on the main VTO232 printed circuit board. Make sure that the connector is correctly aligned over the ten pins.

At the rear of the instrument there are a row of switches. Push the switch marked PLL down.



Adjustment

The phase locked loop board has a wide tracking range to allow most video recorders to be used on playback with the video overlay. If the picture is not centred, adjust the red capacitor trimmer marked TRIM1 on the phase locked loop board. If any vertical lines or text appear 'wavy' on the screen then adjust the red capacitor trimmer marked TRIM2 on the phase locked loop board.